

AD-A189 777

SAFE HAVENS FOR AVOIDANCE OF DANGEROUS WEATHER AND SEA
STATE IN THE MEDIT. (U) COASTAL AND MARINE ENGINEERING
RESEARCH INST HAIFA (ISRAEL).. N STIASSNIE FEB 87

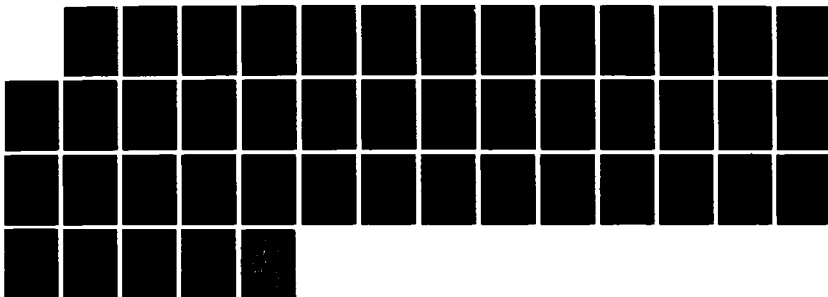
1/1

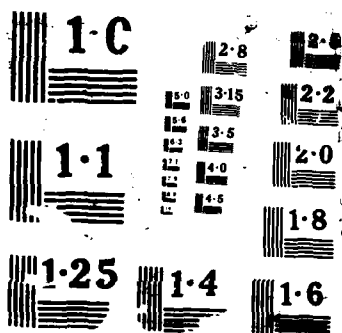
UNCLASSIFIED

N00014-85-G-0523

F/G 13/10

NL





DTIC FILE COPY

4

Cameri

Coastal and Marine
Engineering
Research Institute
ISRAEL



Department of the Navy
Office of Naval Research
U. S. A.

SAFE HAVENS FOR AVOIDANCE OF DANGEROUS WEATHER
AND SEA STATE
IN THE MEDITERRANEAN

AD-A189 777

ASHDOD PORT

A study of the weather conditions in the Ashdod Port area, based on a review of the meteorological data collected during the period 1964-1966. The study is intended to provide a basis for the design of a safe haven for the port.

P. N. 188/67

DTIC
ELECTE
DEC 16 1987
S H D

FEBRUARY 1967

TECHNION CITY, HAIFA, ISRAEL

AD-A189777

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 0704-0188	
1a REPORT SECURITY CLASSIFICATION Unclassified			1b RESTRICTIVE MARKINGS		
2a SECURITY CLASSIFICATION AUTHORITY			3 DISTRIBUTION / AVAILABILITY OF REPORT		
2b DECLASSIFICATION / DOWNGRADING SCHEDULE			Approved for Public Release Unlimited Distribution		
4 PERFORMING ORGANIZATION REPORT NUMBER(S)			5 MONITORING ORGANIZATION REPORT NUMBER(S)		
6a. NAME OF PERFORMING ORGANIZATION Technion-Israel Institute		6b OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION Office of Naval Research		
6c. ADDRESS (City, State, and ZIP Code) CAMERI-Coastal and Marine Engineering Res. Institute Technion City, Haifa 3200 Israel			7b. ADDRESS (City, State, and ZIP Code) 800 N. Quincy St. Arlington, VA 22217-5000		
8a. NAME OF FUNDING / SPONSORING ORGANIZATION		8b OFFICE SYMBOL (If applicable)	9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER N00014-85-G-0523		
8c. ADDRESS (City, State, and ZIP Code)			10 SOURCE OF FUNDING NUMBERS		
			PROGRAM ELEMENT NO 61153N33	PROJECT NO RR03303	TASK NO RR0330301
					WORK UNIT ACCESSION NO. 211-292
11. TITLE (Include Security Classification) Safe Havens for Avoidance of Dangerous Weather and Sea State in the Mediterranean					
12 PERSONAL AUTHOR(S) Professor Michael Stiassnie					
13a. TYPE OF REPORT Final		13b TIME COVERED FROM 8/85 TO 4/86		14 DATE OF REPORT (Year, Month, Day) 1987 February	
15 PAGE COUNT 39					
16 SUPPLEMENTARY NOTATION					
17 COSATI CODES			18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number)		
FIELD	GROUP	SUB-GROUP			
08	03		Mediterranean Ports, Sea State, Dangerous Weather		
04	02				
19 ABSTRACT (Continue on reverse if necessary and identify by block number) <p>The port of Asodd is located approximately 25 miles south of Tel Aviv, at the mouth of Wadi Lakhis, on the southern side of Israeli Mediterranean coast. The port is protected by breakwaters of 2200m and 900m to the southwest and north respectively. The port presently has 950 berths.</p> <p>The important environmental parameters are wind, visibility, waves, tides and currents. Climatologies of each are provided.</p> <p>Tactics for five categories of Navy vessels ranging from motor boats to aircraft carriers are recommended for various weather scenarios to obtain safe havens and leave/stay decisions for Asdod Port are presented.</p>					
20 DISTRIBUTION / AVAILABILITY OF ABSTRACT <input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS			21 ABSTRACT SECURITY CLASSIFICATION		
22a NAME OF RESPONSIBLE INDIVIDUAL ALAN I. WEINSTEIN			22b TELEPHONE (Include Area Code) 202/696-4532		22c OFFICE SYMBOL

Cameri

Coastal and Marine
Engineering
Research Institute
ISRAEL



Department of the Navy
Office of Naval Research
U . S . A .

**SAFE HAVENS FOR AVOIDANCE OF DANGEROUS WEATHER
AND SEA STATE
IN THE MEDITERRANEAN**

ASHDOD PORT

P.N.188/87

FEBRUARY 1987

TECHNION CITY, HAIFA, ISRAEL

Accession For	
NTIS CBA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
Distribution/	
Availability Codes	
Avail and/or	
Dist	
A-1	

CONTENTS

List of Tables.....	II
List of Figures.....	III
1. Description of the Port.....	1
2. Climate of the Mediterranean Coast of Israel.....	2
3. Wind Climate.....	5
4. Visibility.....	6
5. Wave climate.....	7
6. Tides and Water Levels.....	8
7. Currents.....	9
8. Bathymetry of the Region and of the Port.....	9
9. Discussion of Tactics for Various Weather Scenarios to Obtain Safe Haven and Leave or Stay Decisions.....	10
10. Sea Bottom Description.....	11

II

List of Tables

- A1. Frequencies of Surface Winds (0/00) at Ashdod, Hourly and Daily Distributions
- A2. Frequencies of Surface Winds (0/00) at Ashdod, Monthly Distributions
- A3. Frequencies of Visibility (0/00) at Ashdod
- A4. Frequencies of Significant Wave Occurance (%) at Ashdod
- A5. Duration of Storms Exceeding a Specified Deep Water Significant wave Height
- A6.A Tactics for Leave or Stay Decisions - Vessel Seakeeping Category 1.
- A6.B Tactics for Leave or Stay Decisions - Vessel Seakeeping Category 2.
- A6.C Tactics for Leave or Stay Decisions - Vessel Seakeeping Category 3.
- A6.D Tactics for Leave or Stay Decisions - Vessel Seakeeping Category 4.
- A6.E Tactics for Leave or Stay Decisions - Vessel Seakeeping Category 5.

III

List of Figures

1. Location of Ashdod Port
2. Bathymetric Chart and Layout Details for Ashdod Port
3. Summer Season - Representative Synoptic Map at Sea Level
- 4a. Transition Seasons - Hot Low and its Paths
- 4b. Transition Seasons - Hot Low at its Peak
- 5a. Transition Seasons - Red Sea Trough With Western Axis
- 5b. Transition Seasons - Red Sea Trough Closing a Low Over the Sea
6. Winter Season - Typical Icelandic Low and Its Paths in the Mediterranean
7. Winter Season - Schematic Description of Italian Low Approaching the Eastern Mediterranean
- 8a. Winter Season - Northern (Cyprus) Low
- 8b. Winter Season - Southern (Gaza) Low
9. Weather Chart of the Storm on January 13, 1968 - the Largest Storm in the Period 1958 - 1986

1. Description of the Port

1.1 Location

Ashdod Port is located approximately 25 miles south of Tel Aviv, at the mouth of Wadi Lakhish (Sukhreir), at the southern side of the Mediterranean coast of Israel (Figure 1).

1.2 Physical Data

Ashdod Port is protected by a 2200 m long main-breakwater based on the southern end of the coastline, heading first seawards and then continuing in the northern direction. A lee-breakwater of 900 m confines the basin to the north (Figure 2).

At present, the total length of berths in the port amounts to 950 m.

Future development projects include the extension of the main breakwater, the relocation of the lee-breakwater to the north, and the creation of another berthing basin.

The lighthouse of the port stands on Jonah's Hill, southeast of the harbour, 68 m above sea-level, and its beacon has a range of 15 nautical miles, the signal of identification is three short flashes every twenty seconds.

The various wharves of the port are described in Figure 2.

2. Climate of the Mediterranean Coast of Israel

2.1 General

The Mediterranean coast of Israel is characterized by the so called "Mediterranean sea climate". This climate is induced by the geographic location of the Israeli coast relative to the world pressure systems. Its characteristic properties are imposed by the subtropic "highs". These "highs", located between latitudes 25 and 30 degrees move with the sun, southward in winter and northward in summer. Consequently, the summer climate is under the influence of the tropic "highs", while in winter the climate of the region is located at the northern boundaries of the subtropic "highs".

In summer these conditions lead to uniform weather with no precipitations.

In winter the region is located between two climatic area, namely the subtropic "highs" in the south and the "conditioned weather" in the North. The conditioned weather area is characterized by moving "lows" (storms) which, when they "succeed" to penetrate into the Mediterranean, precipitations and bad weather conditions occur. Therefore, the winter is characterized by changing weather, precipitations - seldom very strong and calms between them.

In addition to these general patterns defining the "Mediterranean sea climate", the region is influenced by other geographic factors, which can be divided in two categories: a) bodies of air and source regions and b) monsoons.

Since the coast of Israel is located at the eastern boundary of the Mediterranean sea, only westerly winds are wet (warm in winter and cold in summer). For other directions the winds will bring dry air (warm in summer and cold in winter).

Furthermore, the African coasts nearby, create a region of encounter between very different bodies of air - warm and dry terrestrial air from the South (dessert) and wet air from the North. Hence the coastal African region will be cyclo-genetic, mainly in the transition seasons (spring and autumn). In summer, the presence of the subtropical low will diminish any activity in that region, while in winter the dessert is not hot enough and consequently the cyclo-generation capability is weak.

Finally, the Mediterranean coast of Israel can be under the influence of monsoons coming from either NE or from SE. In both cases, the pressure systems generated improve the weather conditions in this region. These systems are the Indian monsoon in summer, the Siberian "high" in winter and the Sudano-Ethiopian "low" active during all seasons, but mainly in the transition seasons, especially in autumn.

2.2 Summer season

The typical atmospheric pressure at sea level in summer is presented in Figure 3.

2.3 Transition seasons (spring and autumn)

As mentioned previously, these seasons are characterized by being controlled by both the subtropical "highs" and by passing "lows". Main phenomena encountered in these seasons are the Red sea "trough" and the hot weather "lows", both characterized by very hot and dry weather.

Typical development and path of hot weather lows is represented in Figure 4a and the map of atmospheric pressure at the peak of the low is represented in Figure 4b.

In Figure 5a is presented a typical Red sea "trough" weather map, while in Figure 5b the low of the Red sea trough has moved over the sea area.

2.4 Winter season

The winter is characterized by changing weather, hence it is difficult to speak about a representative condition. Nevertheless, one may observe situations leading to very well defined and characteristic weather, against the majority of winter days in which the weather is in a state of transition.

The most significant is the Mediterranean sea low which originates from the strong Icelandic low, present the year around. The latter originates from the encounter between very cold polar air and the warm air raising in the area between England and Iceland due to the Gulf stream. This encounter leads to the creation of a strong cyclogenetic source and the Icelandic low is present as mentioned above during most of the year.

The low migrates in the south east direction as indicated by the arrows in Figure 6. During its migration, the low lowers and weakens. However it strengthens again in the Italy region due to Alpine winds blowing towards the Genova bay (Figure 7).

On its way between Italy and Greece the low may take either the north-eastern track inducing only slight cloudiness in the Israeli region or may take the eastern track bringing the low opposite to the Israeli coast. In the latter case the low will bring cloudiness and precipitation.

In the latter case, on its way towards Alexandretta bay, the low may strengthen again due to winds coming from Turkey and generate a strong "Cyprus low" (Figure 8a) which may remain stationary for a few days and induce high sea states in the coastal area of Israel. The surface weather chart of the storm on January 13, 1968, the largest storm encountered in the period 1958 - 1986, is presented in Figure 9.

Another characteristic situation which may occur is due to the presence of lows located with their centers in the south-eastern part of the Mediterranean, so called "Gaza lows" (Figure 8b).

3. WIND CLIMATE

3.1 Intensity distribution

light winds (less than 10 knots)	- 81% of the time
fresh winds (11 to 21 knots)	- 18% of the time
strong winds (22 to 33 knots)	- 1% of the time
winds stronger than 34 knots	- less than 1% of the time

3.2 Directional distribution

77% of the fresh winds are from the W-NW-N directions
 77% of the strong winds are from the SW-W directions

3.3 Diurnal distribution

81% of the strong winds are during the day, 06-09-12-15 GMT
 19% of the strong winds are during the night, 18-21-00-13 GMT

3.4 Seasonal ditribution

94% of the strong winds are between Nov. and March
 60% of the strong winds are in Jan. and Feb.

For details see tables A1 , A2

4. VISIBILITY

4.1 Annual distribution

good visibility (greater than 6 Km)	- 95% of the time
intermediate visibility (between 1 to 5 Km)	- 4% of the time
bad visibility (less than 1 Km)	- 1% of the time
extremely bay visibility (less than 100 m)	- 3% of the time

4.2 Diurnal distribution

64% of the intermediate visibility conditions are at 00-03-06 GMT
 76% of the bad visibility conditions are at 00-03-06 GMT
 96% of the extremely bad conditions are at 21-00-03-06 GMT

4.3 Seasonal distribution

60% of the bad visibility conditions occur during March to June
 73% of the extremely bad conditions occur during March to June

For more details see table A3

5. WAVE CLIMATE (DEEP WATER)

5.1 Annual significant wave height distribution

low waves (less than 1m)	- 58% of the time
moderate waves (1 to 2 meters)	- 28% of the time
high waves (2 to 4 meters)	- 12% of the time
very high waves (more than 4m)	- 2% of the time

All waves approach from the NNW-W-WSW directions
 66% of the waves approach from the WNW through W directions

5.2 Winter season (Nov.-March)

low waves (less than 1m)	- 50% of the time
moderate waves (1 to 2 meters)	- 25% of the time
high waves (2 to 4 meters)	- 20% of the time
very high waves (more than 4m)	- 5% of the time

5.3 Summer season (April-Oct.)

low waves (less than 1m)	- 65% of the time
moderate waves (1 to 2 meters)	- 30% of the time
high waves (2 to 4 waves)	- 5% of the time

5.4 Extreme Wave Statistics

The average recurrence of extreme sea states (deep water significant wave heights) is given below:

Recurrence (years)	1	5	20	50	100	500
Wave height (m)	5.00	6.15	7.40	8.19	8.70	10.15

6. TIDES AND WATER LEVELS

Astronomical tidal variations are in the order of 0.4 m at spring tide and 0.15 m at neap tide. However, extreme levels may occur due to extreme meteorological conditions.

The average recurrence of extreme sea levels measured from MSL is given below:

Average Recurrence (years)	1	50	100
Lowest Low Sea Water Level (m)	-0.41	-0.79	-0.90
Highest High Sea Water Level (m)	+0.60	+1.00	+1.06

7. CURRENTS

7.1 Tidal Currents

The values of tidal currents in this region are in general low, about one tenth of a knot.

7.2 Wave Currents

Wave induced currents occur inside the breaker zone, flowing mainly parallel to the coast line (longshore currents induced by waves approaching oblique to the contour lines), but sometimes also narrow currents flowing offshore may occur (rip currents). The maximum theoretical values of the longshore current may reach 3 to 4 knots during storms at a distance of about 2/3 of the surf zone measured from the shore line. However, outside the surf zone the longshore is estimated to diminishes rapidly to a few inches/second at about 15 m water depth.

7.3 General Currents

A general current due to the water mass circulation in the Mediterranean is encountered the year around. Its activity is observed mainly in the offshore region beyond contour line of 20 m depth. Its direction is anticlockwise and parallel to the coast line and its mean velocity of about 1/4 to 1/2 knot.

8. BATHYMETRY OF THE REGION AND OF THE PORT

The bathymetry of the region of the eastern Mediterranean is presented in Figure 1.

In Figure 2 is presented the bathymetry of the Ashdod port and its surroundings.

9. DISCUSSION OF TACTICS FOR VARIOUS WEATHER SCENARIOS TO OBTAIN SAFE HAVEN AND LEAVE OR STAY DECISIONS

The tactics recommended for various weather scenarios to obtain safe haven and leave or stay decisions for Ashdod port are presented in tables A6 (a-e).

As they are mainly related to the seakeeping capabilities of the various U.S. Navy vessels as imposed by various sea state conditions both while underway and at anchorage, the vessels were roughly classified in 5 seakeeping categories as described below:

Category 1 (Lbp \leq 15 meter, displacement less than 20 m tons.)

boats, motor boats, landing craft. See table A6-A.

Category 2 (Lbp=20-70 meter, displ. 20 m tons - 700 m tons.)

Patrol boats, rescue boats, mine sweeping boats, patrol ships, SES, warping tugs, landing craft, mine warfare ships, hydrofoils, air cushion vehicles, world war II P.T. See table A6-B.

Category 3 (Lbp=70-160 meter, displ. 800 m tons - 9000 m tons.)

Corvettes, frigates, destroyers, salvage ships, cargo ships, cruisers, submarines (at surface), amphibious transport deck ships, tank landing ships. See table A6-C.

Category 4 (Lbp=140-250 meter, displ. 10000 m tons - 70000 m tons.)

Cruisers, submarines (at surface), amphibious ships, cargo ships, oilers, dock landing ships, auxiliary ships, salvage ships, battle ships. See table A6-D.

Category 5 (Lbp=270-330 meter, displ. 40000 m tons - 100000 m tons.)

Aircraft carriers. See table A6-E.

10. SEA BOTTOM DESCRIPTION

The sea bottom of the area opposite Ashdod port and southward is composed of sand (mean diameter about 0.25 mm) extending from shoreline to about contour lines - 30 m. Beyond this contour line the bottom is composed of fine sand and silt mixture to the edge of the coastal shelf.

Consequently the anchorage holding capacities differ in the two regions and depend also on the type and sizes of anchors used.

T A B L E S

TABLE A1

FREQUENCIES OF SURFACE WINDS (0/00) AT ASHDOD

HOURLY AND DAILY DISTRIBUTION

00 GMT	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									129
	1- 3	1	6	16	34	17	3	6	2	85
	4- 6	8	13	49	276	118	7	17	18	505
	7-10	6	10	16	76	79	3	16	11	216
	11-16	2	0	0	3	20	6	10	6	47
	17-21	0	0	0	0	2	1	9	2	14
	22-27	0	1	0	0	0	1	2	0	4
	28-33	0	0	0	0	0	0	0	0	0
	34-99	0	0	0	0	0	0	0	0	0
	TOT	17	30	80	389	236	21	59	39	
03 GMT	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									78
	1- 3	2	3	7	29	15	1	2	4	62
	4- 6	2	10	34	333	99	11	10	12	510
	7-10	9	5	15	109	115	5	10	7	274
	11-16	2	0	0	1	28	5	18	6	59
	17-21	0	0	0	0	2	3	8	0	13
	22-27	0	0	0	0	1	2	0	0	3
	28-33	0	0	0	0	0	0	0	0	0
	34-99	0	0	0	0	0	0	0	0	0
	TOT	15	18	55	471	259	27	48	29	
06 GMT	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									133
	1- 3	8	9	26	49	32	22	26	10	182
	4- 6	10	11	33	115	91	30	42	15	348
	7-10	12	2	8	45	92	39	26	12	237
	11-16	0	1	2	2	33	10	20	6	74
	17-21	1	0	0	0	6	2	6	1	16
	22-27	0	0	1	0	1	1	2	2	8
	28-33	0	0	0	0	0	1	0	1	2
	34-99	0	0	0	0	0	0	1	0	1
	TOT	32	23	70	211	256	105	123	47	

TABLE A1 - CONTINUED

FREQUENCIES OF SURFACE WINDS (0/00) AT ASHDOD

HOURLY AND DAILY DISTRIBUTION

09 GMT	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									40
	1- 3	2	3	5	4	3	2	11	12	40
	4- 6	14	6	5	5	19	12	52	42	156
	7-10	33	7	5	3	33	28	191	149	449
	11-16	24	0	2	2	17	42	128	45	259
	17-21	1	0	0	0	4	20	14	4	42
	22-27	0	0	0	1	1	5	5	0	11
	28-33	0	0	0	0	0	0	1	0	1
	34-99	0	0	0	0	0	0	1	0	1
	TOT	73	16	16	14	77	108	402	252	
12 GMT	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									13
	1- 3	14	3	5	1	6	5	18	12	64
	4- 6	17	3	1	1	15	18	41	46	122
	7-10	53	4	1	3	12	22	190	138	324
	11-16	74	2	3	5	19	30	119	164	406
	17-21	17	1	0	0	1	9	12	14	55
	22-27	1	0	0	0	0	6	3	1	12
	28-33	0	0	0	0	1	0	2	0	3
	34-99	0	0	0	0	0	0	1	0	1
	TOT	177	13	10	11	34	80	287	375	
15 GMT	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									34
	1- 3	16	6	4	3	4	5	15	11	52
	4- 6	44	12	8	7	19	11	31	61	183
	7-10	141	17	5	1	10	20	163	189	446
	11-16	115	2	0	2	1	4	45	73	241
	17-21	15	0	0	0	0	3	7	7	33
	22-27	1	0	0	0	0	3	4	0	7
	28-33	0	0	0	0	0	1	3	0	4
	34-99	0	0	0	0	0	0	0	0	0
	TOT	332	36	17	12	24	46	157	341	

TABLE A1 - CONTINUED

FREQUENCIES OF SURFACE WINDS (0/00) AT ASHDOD

HOURLY AND DAILY DISTRIBUTION

18 GMT	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									173
	1- 3	50	27	38	20	7	9	20	38	208
	4- 6	76	61	51	54	25	9	33	41	349
	7-10	49	30	16	14	12	4	22	34	182
	11-16	18	3	0	1	4	6	14	7	53
	17-21	4	1	0	0	0	4	12	2	22
	22-27	0	1	0	0	1	3	4	3	11
	28-33	1	0	0	0	0	1	0	0	1
	34-99	0	0	0	0	0	0	0	0	0
	TOT	198	122	104	90	49	35	104	125	
21 GMT	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									273
	1- 3	10	11	28	42	15	4	9	7	125
	4- 6	16	26	71	147	43	12	26	31	372
	7-10	7	17	19	39	40	5	19	16	163
	11-16	10	2	2	0	11	2	12	7	36
	17-21	0	1	0	0	2	4	11	8	25
	22-27	0	0	0	0	0	2	2	0	4
	28-33	0	0	0	0	0	0	2	0	2
	34-99	0	0	0	0	0	0	0	0	0
	TOT	33	57	120	229	112	28	81	68	
DAILY	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									113
	1- 3	14	9	16	22	12	7	13	13	107
	4- 6	25	18	30	105	48	13	33	34	305
	7-10	39	12	10	33	47	17	55	70	283
	11-16	30	1	1	2	15	13	47	42	153
	17-21	5	0	0	0	2	6	10	5	28
	22-27	0	0	0	0	1	3	3	1	8
	28-33	0	0	0	0	0	0	1	0	2
	34-99	0	0	0	0	0	0	0	0	0
	TOT	114	40	58	163	125	59	162	165	

TABLE A2

FREQUENCIES OF SURFACE WIND (0/100) AT ASHDED

MONTHLY DISTRIBUTION

JAN	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									70
	1- 3	7	10	22	21	11	3	8	6	88
	4- 6	21	10	43	129	45	7	17	13	295
	7-10	14	6	20	74	67	37	28	22	268
	11-16	13	0	1	6	49	41	41	17	167
	17-21	4	0	0	0	7	44	13	4	72
	22-27	1	0	0	0	3	17	8	1	31
	28-33	1	0	0	0	0	1	6	0	8
	34-99	0	0	0	0	0	0	0	0	0
	TOT	62	25	91	230	183	149	121	69	

FEB	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									66
	1- 3	6	1	10	16	15	4	7	10	71
	4- 6	7	12	40	120	50	27	53	45	358
	7-10	16	9	9	45	77	21	50	40	267
	11-16	9	0	3	4	42	31	43	21	153
	17-21	0	0	0	0	6	9	25	10	50
	22-27	0	0	1	1	3	12	10	1	30
	28-33	0	0	0	0	1	3	0	0	4
	34-99	0	0	0	0	0	0	0	0	0
	TOT	39	22	64	187	193	107	193	128	

MAR	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									92
	1- 3	23	0	23	71	17	4	12	4	117
	4- 6	20	17	39	94	37	15	33	21	275
	7-10	47	14	12	36	56	24	56	45	385
	11-16	23	0	1	1	37	21	73	22	171
	17-21	1	0	1	0	7	3	22	6	46
	22-27	0	0	0	0	1	1	4	0	7
	28-33	0	0	0	0	0	1	2	0	3
	34-99	0	0	0	0	0	0	0	0	0
	TOT	123	31	74	151	112	61	207	92	

TABLE A2 - CONTINUED

FREQUENCIES OF SURFACE WIND (O/00) AT ASHDOD

MONTHLY DISTRIBUTION

APR	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									99
	1- 3	18	12	21	19	19	6	23	14	133
	4- 6	36	28	36	139	40	10	35	35	259
	7-10	61	13	17	37	24	10	66	41	290
	11-16	41	0	3	4	5	9	85	41	198
	17-21	6	1	0	0	0	1	12	5	26
	22-27	1	0	0	0	0	1	3	0	5
	28-33	0	0	0	0	0	0	0	0	0
	34-99	0	0	0	0	0	0	0	0	0
	TOT	164	54	76	99	90	39	233	156	

MAY	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									127
	1- 3	18	10	19	16	1	6	12	18	103
	4- 6	45	21	24	55	34	13	28	41	262
	7-10	67	19	12	27	19	6	36	86	274
	11-16	89	5	2	1	4	0	48	60	208
	17-21	17	0	0	0	0	0	5	2	24
	22-27	1	0	0	0	0	0	0	0	1
	28-33	0	0	0	0	0	0	0	0	0
	34-99	0	0	0	0	0	0	0	0	0
	TOT	237	56	58	101	58	26	128	206	

JUN	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									162
	1- 3	24	4	10	11	11	12	14	20	106
	4- 6	45	12	7	77	52	17	41	38	290
	7-10	48	2	0	10	36	21	63	98	202
	11-16	40	0	0	0	1	5	55	57	150
	17-21	7	0	0	0	0	0	1	4	12
	22-27	0	0	0	0	0	0	0	0	0
	28-33	0	0	0	0	0	0	0	0	0
	34-99	0	0	0	0	0	0	0	0	0
	TOT	164	19	19	198	101	55	178	202	

TABLE A2 - CONTINUED

FREQUENCIES OF SURFACE WIND (3/00) AT ASHDOO

MONTHLY DISTRIBUTION

JUL	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									115
	1- 3	13	6	5	16	18	24	28	16	126
	4- 6	16	4	66	63	64	17	49	49	269
	7-10	12	4	0	12	56	25	97	126	333
	11-16	8	0	0	0	0	5	75	63	152
	17-21	0	0	0	0	0	0	4	1	5
	22-27	0	0	0	0	0	0	0	0	0
	28-33	0	0	0	0	0	0	0	0	0
	34-99	0	0	0	0	0	0	0	0	0
	TOT	50	13	11	91	138	74	252	255	
AUG	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									131
	1- 3	8	3	7	14	8	4	15	17	77
	4- 6	20	8	3	112	70	13	36	28	209
	7-10	20	0	1	13	52	13	99	100	297
	11-16	17	0	0	0	4	4	77	67	172
	17-21	1	0	0	0	0	0	0	3	4
	22-27	0	0	0	0	0	0	0	0	0
	28-33	0	0	0	0	0	0	0	0	0
	34-99	0	0	0	0	0	0	0	0	0
	TOT	66	11	11	130	134	33	270	215	
SEP	KNTS	N	NE	E	SE	S	SW	W	NW	TOT
	CALM									114
	1- 3	13	12	13	10	17	10	13	16	120
	4- 6	26	20	13	126	62	9	20	14	312
	7-10	61	1	0	5	13	3	55	116	254
	11-16	42	0	0	0	0	1	26	21	150
	17-21	5	0	0	0	0	0	0	4	9
	22-27	0	0	0	0	0	0	0	0	0
	28-33	0	0	0	0	0	0	0	0	0
	34-99	0	0	0	0	0	0	0	0	0
	TOT	150	33	21	150	89	13	117	251	

TABLE A3

FREQUENCIES OF VISIBILITY (0/00) AT ASHDOD

ANNUAL	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	5.0 TO 9.0 KM.	GT. THAN 10. KM.
HOUR GMT						
00	4	8	19	19	137	814
03	14	74	32	72	241	616
06	5	8	18	37	275	661
09	0	4	8	17	150	821
12	1	3	12	14	90	980
15	0	3	10	14	82	891
18	0	2	8	8	76	913
21	3	2	6	12	61	895
JAN.	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	5.0 TO 9.0 KM.	GT. THAN 10. KM.
HOUR GMT						
00	0	0	17	33	83	867
03	13	0	0	113	65	909
06	11	0	11	121	121	736
09	0	0	11	65	98	826
12	0	0	33	65	98	804
15	0	0	34	34	80	851
18	0	0	11	34	46	908
21	0	0	24	12	36	929
FEB.	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	5.0 TO 9.0 KM.	GT. THAN 10. KM.
HOUR GMT						
00	0	0	18	0	70	912
03	0	0	13	13	50	928
06	0	12	24	48	169	747
09	0	12	24	36	202	726
12	0	35	13	33	63	863
15	0	0	51	25	63	861
18	0	0	25	13	50	913
21	0	0	13	0	22	948

TABLE A3 - CONTINUED

FREQUENCIES OF VISIBILITY (0/00) AT ASHDOD

MAR	HOUR GMT	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	5.0 TO 9.0 KM.	GT. THAN 10. KM.
	00	0	33	50	0	50	867
	03	0	44	44	22	111	778
	06	11	43	32	32	237	645
	09	0	23	35	23	151	767
	12	0	11	43	0	140	806
	15	0	11	22	22	97	849
	18	0	11	22	11	44	912
	21	0	11	34	22	34	899
APRIL	HOUR GMT	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	5.0 TO 9.0 KM.	GT. THAN 10. KM.
	00	0	17	34	17	155	778
	03	10	18	53	70	345	596
	06	0	17	17	67	267	633
	09	0	0	17	17	293	672
	12	0	0	17	17	200	767
	15	0	0	17	17	203	603
	18	0	0	34	17	153	797
	21	17	0	34	17	135	797
MAY	HOUR GMT	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	5.0 TO 9.0 KM.	GT. THAN 10. KM.
	00	32	0	11	0	151	206
	03	33	43	33	93	404	370
	06	0	11	22	11	312	645
	09	0	0	11	11	211	767
	12	0	0	0	11	120	870
	15	0	0	0	11	110	879
	18	0	0	11	0	130	852
	21	0	0	0	11	108	882

TABLE A3 - CONTINUED

FREQUENCIES OF VISIBILITY (0700) AT ASHDOD

JUN	HOUR GMT	LT. THAN	0.2 TO	1.1 TO	3.1 TO	6.0 TO	GT. THAN
		0.1 KM.	1.0 KM.	3.0 KM.	5.0 KM.	9.0 KM.	10. KM.
	00	11	22	67	56	303	539
	03	57	57	91	216	375	205
	06	0	0	22	67	400	511
	09	0	0	0	0	256	744
	12	0	0	0	11	100	889
	15	0	0	0	11	76	911
	18	0	0	0	0	133	867
	21	11	0	0	11	244	733
JUL	HOUR GMT	LT. THAN	0.2 TO	1.1 TO	3.1 TO	6.0 TO	GT. THAN
		0.1 KM.	1.0 KM.	3.0 KM.	5.0 KM.	9.0 KM.	10. KM.
	00	0	11	0	33	209	747
	03	33	11	89	144	456	267
	06	0	0	0	11	441	548
	09	0	0	0	0	110	862
	12	0	0	0	0	97	903
	15	0	0	0	0	87	913
	18	0	0	0	0	87	913
	21	0	0	0	11	76	913
AUG.	HOUR GMT	LT. THAN	0.2 TO	1.1 TO	3.1 TO	6.0 TO	GT. THAN
		0.1 KM.	1.0 KM.	3.0 KM.	5.0 KM.	9.0 KM.	10. KM.
	00	0	0	11	34	287	667
	03	0	80	11	227	477	205
	06	0	0	11	34	545	409
	09	0	0	0	0	101	899
	12	0	0	0	0	76	924
	15	0	0	0	0	87	913
	18	0	0	0	0	87	913
	21	0	0	0	11	100	889

TABLE A3 - CONTINUED

FREQUENCIES OF VISIBILITY (0/00) AT ASHDOD

SEP.	HOUR GMT	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	6.0 TO 9.0 KM.	GT. THAN 10. KM.
	00	0	0	17	0	67	917
	03	0	0	34	11	356	598
	06	0	0	0	11	273	716
	09	0	0	0	0	68	932
	12	0	0	0	0	33	967
	15	0	0	0	11	22	966
	18	0	0	0	0	22	979
	21	0	0	0	12	47	941
OCT.	HOUR GMT	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	6.0 TO 9.0 KM.	GT. THAN 10. KM.
	00	0	0	0	13	63	924
	03	11	11	0	22	159	737
	06	11	0	32	0	172	785
	09	0	0	0	0	75	925
	12	0	0	0	0	22	978
	15	0	0	0	0	22	979
	18	0	0	0	0	11	999
	21	0	0	0	11	75	914
NOV.	HOUR GMT	LT. THAN 0.1 KM.	0.2 TO 1.0 KM.	1.1 TO 3.0 KM.	3.1 TO 5.0 KM.	6.0 TO 9.0 KM.	GT. THAN 10. KM.
	00	0	0	11	32	44	923
	03	0	11	22	0	54	913
	06	0	17	0	43	123	757
	09	0	0	0	44	140	867
	12	0	0	17	13	22	953
	15	0	10	0	21	62	896
	18	0	0	0	13	57	937
	21	11	0	0	11	47	936

TABLE A3 - CONTINUED

FREQUENCIES OF VISIBILITY (0/00) AT ASHDOD

DEC.	HOUR GMT	LT. THAN	0.2 TO	1.1 TO	3.1 TO	6.0 TO	GT. THAN
		0.1 KM.	1.0 KM.	3.0 KM.	5.0 KM.	9.0 KM.	10. KM.
	00	0	11	0	0	67	921
	03	0	11	0	22	77	890
	06	0	0	22	11	204	763
	09	0	11	0	0	141	848
	12	11	0	0	11	76	902
	15	0	11	11	11	54	914
	18	0	11	0	11	43	935
	21	0	11	0	11	43	935

TABLE A4

TABLE A4: FREQUENCIES OF SIGNIFICANT WAVE OCCURANCE (%) AT ASHDOD

SUMMER (APRIL - OCTOBER)

DIR.	H _s (m)	T _s (SEC)					TOTAL	
		3-5.5	6-7.5	8-9.5	10-11.5	12-14		
WSW	0-1	3.38	0.11	0.06	0.00	0.00	3.55	6.40
	1-2	2.13	0.26	0.03	0.00	0.00	2.42	
	2-3	0.20	0.06	0.03	0.00	0.00	0.29	
	3-4	0.00	0.03	0.08	0.00	0.00	0.11	
	4-6	0.00	0.00	0.00	0.00	0.00	0.00	
	6-8	0.00	0.00	0.00	0.00	0.00	0.00	
W	0-1	13.63	2.03	0.03	0.00	0.00	15.70	31.90
	1-2	7.38	5.00	0.43	0.03	0.00	12.84	
	2-3	1.30	0.68	0.88	0.03	0.00	2.89	
	3-4	0.08	0.03	0.24	0.00	0.00	0.35	
	4-6	0.05	0.00	0.00	0.06	0.00	0.11	
	6-8	0.00	0.00	0.00	0.00	0.00	0.00	
WNW	0-1	15.01	5.23	0.41	0.03	0.00	21.58	31.50
	1-2	3.68	4.38	0.64	0.00	0.00	8.70	
	2-3	0.40	0.39	0.26	0.00	0.03	1.08	
	3-4	0.03	0.00	0.03	0.00	0.00	0.06	
	4-6	0.03	0.00	0.00	0.00	0.00	0.03	
	6-8	0.00	0.00	0.00	0.00	0.00	0.00	
NW	0-1	14.86	1.60	0.16	0.00	0.00	16.62	20.80
	1-2	1.93	1.66	0.22	0.00	0.00	3.81	
	2-3	0.16	0.06	0.13	0.00	0.00	0.35	
	3-4	0.05	0.00	0.00	0.00	0.00	0.05	
	4-6	0.00	0.00	0.00	0.00	0.00	0.00	
	6-8	0.00	0.00	0.00	0.00	0.00	0.00	
NNW	0-1	7.18	0.36	0.03	0.03	0.00	7.60	9.40
	1-2	0.91	0.78	0.00	0.00	0.00	1.69	
	2-3	0.08	0.03	0.03	0.00	0.00	0.14	
	3-4	0.00	0.00	0.00	0.00	0.00	0.00	
	4-6	0.00	0.00	0.00	0.00	0.00	0.00	
	6-8	0.00	0.00	0.00	0.00	0.00	0.00	

TABLE A4 - CONTINUED

FREQUENCIES OF SIGNIFICANT WAVE OCCURANCE (%) AT ASHDOD

YEARLY

DIR.	H _s (m)	T _s (SEC)					TOTAL	
		3-5.5	6-7.5	8-9.5	10-11.5	12-14		
WSW	0-1	2.94	0.24	0.06	0.00	0.00	3.24	6.70
	1-2	1.81	0.26	0.04	0.00	0.00	2.11	
	2-3	0.50	0.08	0.11	0.02	0.00	0.71	
	3-4	0.13	0.06	0.18	0.04	0.00	0.41	
	4-6	0.10	0.00	0.10	0.04	0.00	0.24	
	6-8	0.00	0.00	0.00	0.02	0.00	0.02	
W	0-1	12.91	1.63	0.06	0.00	0.00	14.60	35.60
	1-2	7.83	4.14	0.42	0.04	0.00	12.43	
	2-3	2.84	1.13	1.16	0.09	0.00	5.22	
	3-4	0.92	0.09	0.68	0.17	0.02	1.88	
	4-6	0.48	0.02	0.32	0.45	0.06	1.33	
	6-8	0.05	0.00	0.00	0.02	0.04	0.11	
WNW	0-1	14.20	4.40	0.64	0.07	0.00	19.31	31.50
	1-2	4.09	3.89	0.88	0.07	0.02	8.95	
	2-3	1.10	0.37	0.64	0.08	0.04	2.23	
	3-4	0.24	0.05	0.20	0.13	0.02	0.64	
	4-6	0.13	0.00	0.11	0.10	0.00	0.34	
	6-8	0.00	0.00	0.03	0.00	0.00	0.03	
NW	0-1	12.72	1.46	0.15	0.00	0.00	14.20	18.20
	1-2	1.68	1.34	0.26	0.00	0.00	3.20	
	2-3	0.22	0.10	0.21	0.00	0.02	0.60	
	3-4	0.11	0.00	0.05	0.04	0.00	0.20	
	4-6	0.00	0.00	0.00	0.02	0.02	0.04	
	6-8	0.00	0.00	0.00	0.00	0.02	0.02	
NNW	0-1	5.91	0.55	0.02	0.02	0.00	6.50	8.00
	1-2	0.68	0.57	0.06	0.00	0.00	1.31	
	2-3	0.08	0.09	0.02	0.00	0.00	0.19	
	3-4	0.00	0.00	0.00	0.00	0.00	0.00	
	4-6	0.00	0.00	0.00	0.00	0.00	0.00	
	6-8	0.00	0.00	0.00	0.00	0.00	0.00	

TABLE A4 - CONTINUED

FREQUENCIES OF SIGNIFICANT WAVE OCCURANCE (%) AT ASHDOD

WINTER (NOV. - MARCH)

DIR.	H _s (m)	T _s (SEC)					TOTAL	
		3-5.5	6-7.5	8-9.5	10-11.5	12-14		
WSW	0-1	2.58	0.34	0.04	0.00	0.00	2.96	7.10
	1-2	1.37	0.22	0.04	0.00	0.00	1.63	
	2-3	0.80	0.10	0.19	0.04	0.00	1.18	
	3-4	0.37	0.08	0.29	0.08	0.00	0.82	
	4-6	0.20	0.00	0.21	0.08	0.00	0.49	
	6-8	0.00	0.00	0.00	0.04	0.00	0.04	
W	0-1	12.27	1.41	0.08	0.00	0.00	13.70	40.90
	1-2	8.74	2.54	1.11	0.04	0.00	12.43	
	2-3	5.18	1.68	1.64	0.16	0.00	8.66	
	3-4	2.04	0.15	1.25	0.45	0.04	3.93	
	4-6	1.07	0.04	0.62	1.05	0.12	2.90	
	6-8	0.11	0.00	0.00	0.04	0.08	0.21	
WNW	0-1	12.69	3.01	0.89	0.11	0.00	16.70	31.40
	1-2	4.62	2.90	1.18	0.15	0.04	8.69	
	2-3	1.80	0.51	1.27	0.14	0.04	3.76	
	3-4	0.48	0.11	0.36	0.28	0.04	1.27	
	4-6	0.27	0.00	0.23	0.22	0.00	0.72	
	6-8	0.00	0.00	0.07	0.00	0.00	0.07	
NW	0-1	9.58	1.02	0.14	0.00	0.00	10.74	14.50
	1-2	1.37	0.95	0.26	0.00	0.00	2.58	
	2-3	0.30	0.15	0.28	0.00	0.04	0.77	
	3-4	0.14	0.00	0.11	0.08	0.00	0.33	
	4-6	0.00	0.00	0.00	0.04	0.04	0.08	
	6-8	0.00	0.00	0.00	0.00	0.04	0.04	
NNW	0-1	4.42	0.61	0.00	0.00	0.00	5.03	6.10
	1-2	0.51	0.21	0.12	0.00	0.00	0.84	
	2-3	0.07	0.14	0.00	0.00	0.00	0.21	
	3-4	0.00	0.00	0.00	0.00	0.00	0.00	
	4-6	0.00	0.00	0.00	0.00	0.00	0.00	
	6-8	0.00	0.00	0.00	0.00	0.00	0.00	

TABLE A5

DURATION OF STORMS EXCEEDING
A SPECIFIED DEEPWATER SIGNIFICANT WAVE HEIGHT AT ASHDOD

SEA STATE EXCEEDED :	AVERAGE NO. OF STORMS PER YEAR	AVERAGE DURATION OF THE SEA STATE PER STORM (HOURS)	STANDARD DEVIATION OF THE DURATION OF THE STORM
HS > = (M)			
SEA STATE OF THE STORM CROSSING THE SPECIFIED LEVEL ONLY			
1.5	33.61	30.35	33.78
2.0	22.70	25.44	28.08
2.5	14.65	22.67	23.23
3.0	9.57	20.83	20.65
3.5	6.61	18.12	17.79
4.0	4.39	15.55	14.35
4.5	2.70	11.87	11.35
5.0	1.39	10.76	9.90
5.5	.70	7.98	6.32
6.0	.39	4.78	3.57

TABLE No. A6-A

VESSEL SEAKEEPING CATEGORY - 1 (LBP \leq 15m Displacement \leq 20 ton)

Vessel types: BOATS, MOTOR BOATS, LANDING CRAFT

WAVE CONDITION		VESSEL LOCATION	
DEEP WATER		VESSEL IN OPEN SEA	VESSEL IN ASHDOO PORT
SEA STATE	H _{s,0} (m)	STORM CONDITION	
		STORM FORECAST	STORM STATE
0-3	0-1	PROCEED ON MISSION. OBSERVE FURTHER FORECASTS, ESPECIALLY IN WINTER.	PROCEED ON MISSION. OBSERVE FURTHER FORECASTS, ESPECIALLY IN WINTER.
4	1-2	PROCEED ON MISSION. OBSERVE FURTHER FORECASTS, ESPECIALLY IN WINTER.	STAY IN PORT. TAUT MOORINGS.
5	2-4	PREPARE FOR REFUGE TO CLOSEST PORT. IN WINTER OBSERVE FURTHER FORECASTS.	DO NOT LEAVE THE PORT. STRENGTHEN AND TAUT MOORINGS.
6	4-6	REFUGE TO CLOSEST PORT. IN WINTER OBSERVE FURTHER FORECASTS.	DO NOT LEAVE THE PORT. STRENGTHEN AND TAUT MOORINGS.

TABLE No. A6-B

VESSEL SEAKEEPING CATEGORY - 2 (L_{BP} = 20m + 70m Displacement = 20 ton + 700 ton)

Vessel types: PATROL BOATS, PATROL SHIPS, MINE SWEEPING BOATS, RESCUE BOATS, SES, WARPING TUGS LANDING CRAFT, MINE WARFARE SHIPS, HYDROFOILS, AIR CUSHION VEHICLES, WORLD WAR II P.T.I.

WAVE CONDITION		VESSEL		LOCATION	
OCEAN WATER		VESSEL IN OPEN SEA		VESSEL IN ASHDOD PORT	
SEA STATE	H _{s,0} (m)	CONDITION			
		STORM		STORM STATE	
0-3	0-1	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.
4	1-2	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.
5	2-4	PROCEED ON MISSION, IN WINTER OBSERVE FURTHER FORECASTS AND BE READY TO REFUGE TO ASHDOD PORT.	IN WINTER REFUGE TO HAIFA BAY OR ASHDOD PORT. IN SUMMER PROCEED ON MISSION AT LOWER SPEED.	PROCEED ON MISSION. OBSERVE FURTHER FORECASTS, ESPECIALLY IN WINTER.	IN SUMMER PROCEED ON MISSION. IN WINTER STAND BY TO REFUGE TO HAIFA BAY IF CONDITIONS WORSEN.
6	4-6	REFUGE TO HAIFA BAY.	ANCHOR IN OPEN SEA. TRY TO REFUGE TO HAIFA BAY OR HAIFA PORT.	REFUGE TO HAIFA BAY.	STAY IN PORT. STRENGTHEN AND TIGHTEN MOORINGS.

TABLE No. A6-C

VESSEL SEAKEEPING CATEGORY - 3 (LBP = 70m + 160m Displacement = 800 ton + 9000 ton)

Vessel types: CORVETTES, FRIGATES, DESTROYERS, SALVAGE SHIPS, CARGO SHIPS, SUBMARINES (AT SURFACE), CRUISERS, AMPHIBIOUS TRANSPORT DECK SHIPS,

TANK LANDING SHIPS

WAVE CONDITION		VESSEL		LOCATION	
DEEP WATER		VESSEL IN OPEN SEA		VESSEL IN ASHDOD PORT	
SEA STATE	H _s , (m)	STORM CONDITION			
		STORM FORECAST	STORM STATE	STORM FORECAST	STORM STATE
0-3	0-1	PROCEED ON MISSION.	PROCEED ON MISSION.	PROCEED ON MISSION.	PROCEED ON MISSION.
4	1-2	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.
5	2-4	PROCEED ON MISSION. IN WINTER PREPARE TO REFUGE TO ASHDOD PORT OR HAIFA BAY. OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER REFUGE TO ASHDOD PORT BUT PREPARE TO LEAVE FOR ANCHORAGE IN HAIFA BAY, IF CONDITIONS WORSEN.	PROCEED ON MISSION. IN WINTER PREPARE TO LEAVE FOR ANCHORAGE IN HAIFA BAY.	OBSERVE NOORINGS AND TAUT LINES. STAND BY FOR MOVING TO HAIFA BAY.
6	4-6	REFUGE TO ASHDOD PORT OR TO HAIFA BAY ANCHORAGE. OBSERVE FURTHER FORECASTS.	REFUGE TO ANCHORAGE IN HAIFA BAY OR PORT OR OUT OF STORM TRACK.	STRENGTHEN AND TALT NOORING LINES. PREPARE TO LEAVE FOR OPEN SEA ANCHORAGE OR FOR HAIFA BAY.	LEAVE PORT FOR ANCHORAGE IN OPEN SEA OR IN HAIFA BAY.
7	6-9	REFUGE TO HAIFA BAY OR MOVE OUT OF STORM TRACK.	TRY TO REFUGE TO HAIFA BAY. IF REMOTE, ANCHOR IN OPEN SEA.	REFUGE TO HAIFA BAY. IF POSSIBLE TO HAIFA PORT.	LEAVE FOR ANCHORAGE IN OPEN SEA. TRY TO REACH HAIFA. IF IMPOSSIBLE TO LEAVE THE PORT, USE MORE NOORING LINES.

TABLE No. A6-D

VESSEL SEAKEEPING CATEGORY - 4 (LBP = 140m + 250m Displacement = 10,000ton + 70,000ton)

Vessel types: CRUISERS, SUBMARINES (AT SURFACE), AMPHIBIOUS SHIPS, CARGO SHIPS, DOCK LANDING SHIPS, TANKERS, AUXILIARY SHIPS, SALVAGE SHIPS, BATTLE

SHIPS.

WAVE CONDITION		VESSEL		LOCATION	
DEEP WATER		VESSEL IN OPEN SEA		VESSEL IN ASHOD PORT	
SEA STATE	H _s , 0 (m)	STORM		CONDITION	
		STORM FORECAST	STORM STATE	STORM FORECAST	STORM STATE
0-3	0-1	PROCEED ON MISSION.	PROCEED ON MISSION.	PROCEED ON MISSION.	PROCEED ON MISSION.
4	1-2	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER OBSERVE FURTHER FORECASTS.
5	2-4	PROCEED ON MISSION. IN WINTER PREPARE TO REFUGE TO HAIFA BAY. OBSERVE FURTHER FORECASTS.	PROCEED ON MISSION. IN WINTER CEASE MISSION AND REFUGE TO ASHOD PORT, BUT BE PREPARED TO LEAVE TO HAIFA BAY, OR TO OPEN SEA IF CONDITIONS WORSEN.	PROCEED ON MISSION. IN WINTER PREPARE TO REFUGE TO HAIFA BAY. OBSERVE FURTHER FORECASTS.	OBSERVE MOORINGS AND TAUT LINES. IN WINTER STAND BY TO REFUGE TO HAIFA BAY. OBSERVE FURTHER FORECASTS.
6	4-6	REFUGE TO HAIFA BAY ANCHORAGE OR MOVE OUT OF STORM TRACK. OBSERVE FURTHER FORECASTS.	REFUGE TO ANCHORAGE IN OPEN SEA OR TO HAIFA BAY OR OUT OF STORM TRACK.	REFUGE TO HAIFA BAY ANCHORAGE OR MOVE OUT OF STORM TRACK. OBSERVE FURTHER FORECASTS.	REFUGE TO HAIFA BAY OR ANCHORAGE IN OPEN SEA. IF IMPOSSIBLE TO LEAVE, STRENGTHEN AND TAUT MOORINGS.
7	6-9	REFUGE TO HAIFA BAY ANCHORAGE OR MOVE OUT OF STORM TRACK.	TRY TO REFUGE TO HAIFA BAY. IF TOO REMOTE ANCHOR IN OPEN SEA.	REFUGE TO HAIFA BAY ANCHORAGE OR MOVE OUT OF STORM TRACK.	TRY TO LEAVE FOR ANCHORAGE IN OPEN SEA OR IN HAIFA BAY. IF IMPOSSIBLE TO LEAVE PORT, ADD EXTRA LINES TO MOORINGS.

F I G U R E S

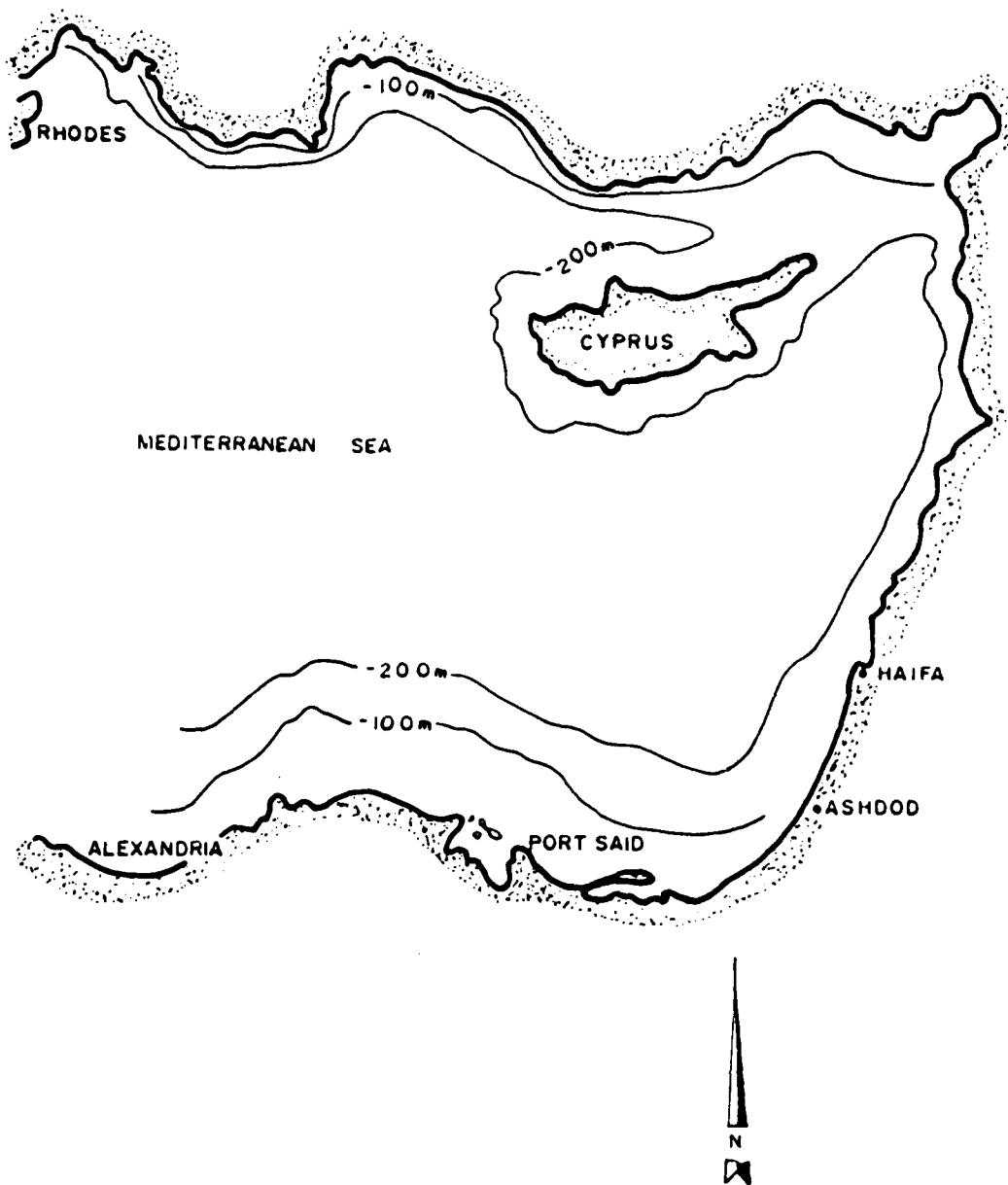


Figure 1 - Location of Ashdod port.

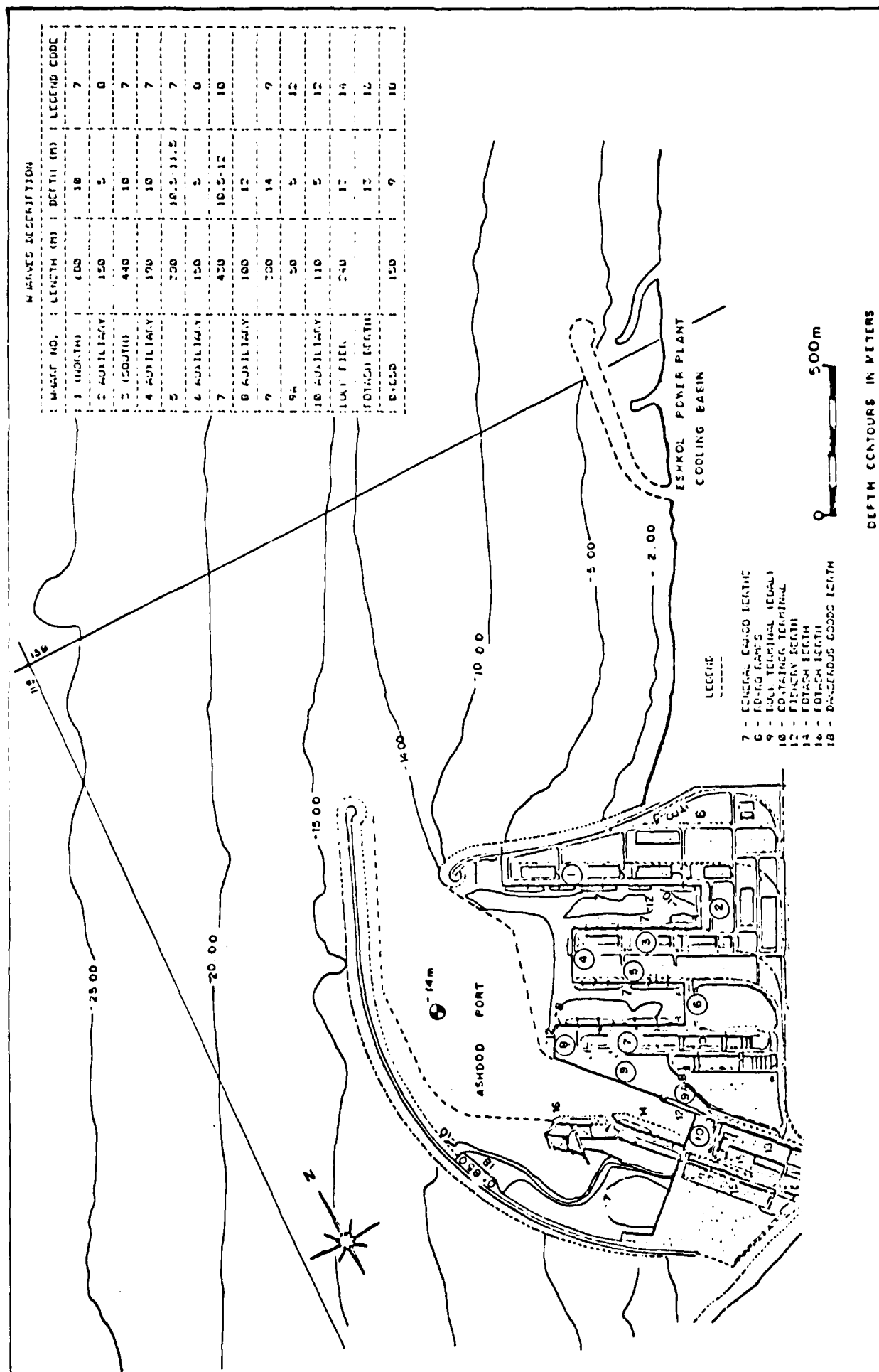


Figure 2 - Bathymetric chart and layout details for Ashdod port.

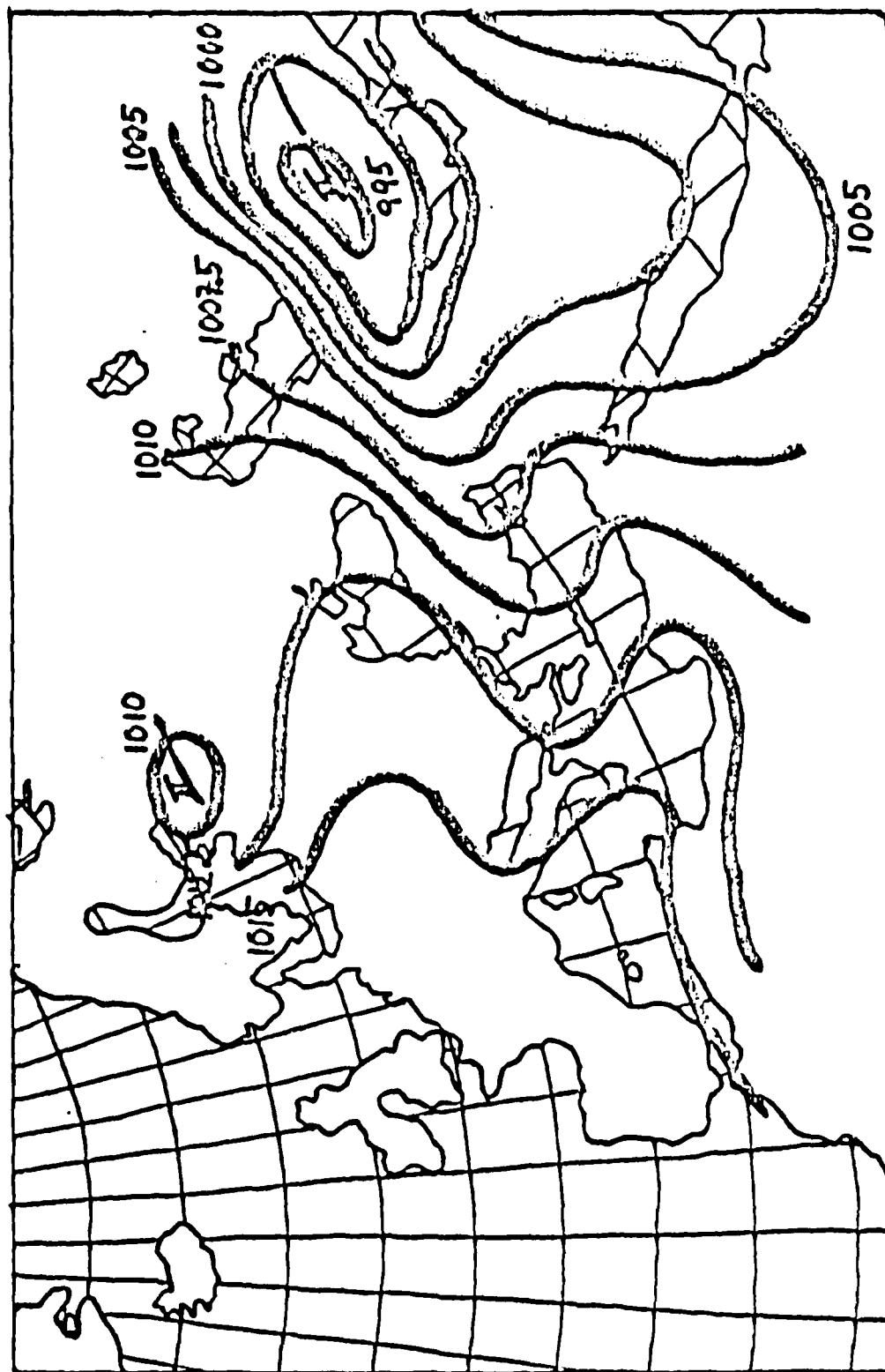


Figure 3 - Summer season - Representative synoptic map at sea level.

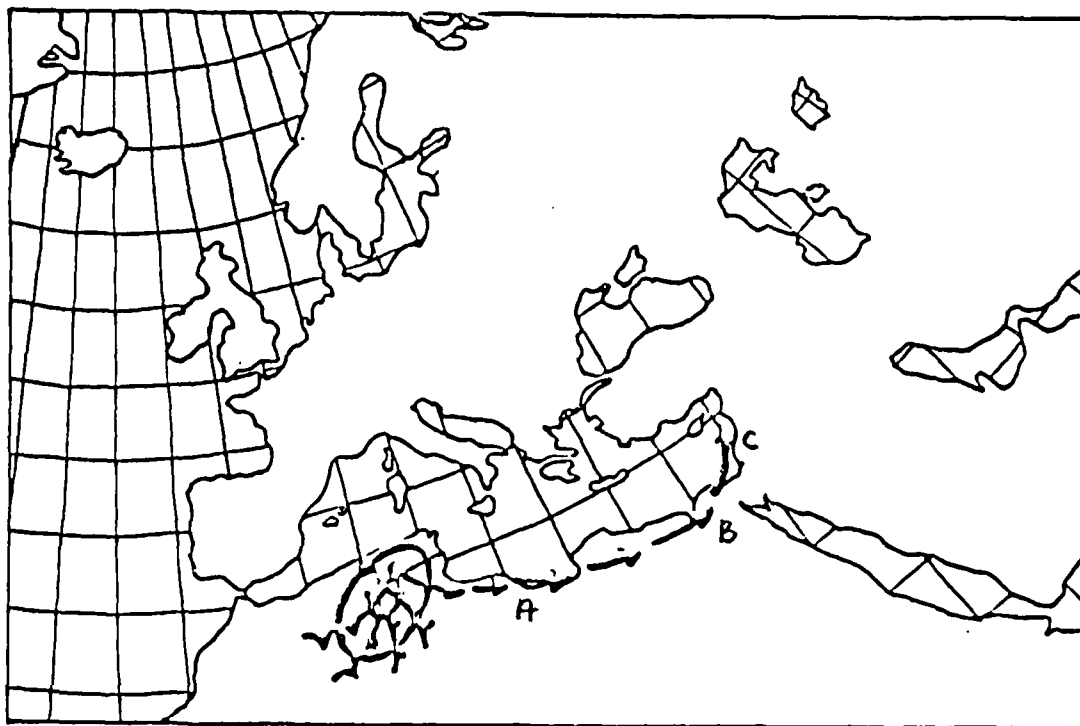


Figure 4a - Transition seasons - Hot "low" and its path: A - Very cloudy in eastern Mediterranean, B - Peak of hot low
C - Displacement of low to sea and disappearance of hot weather.

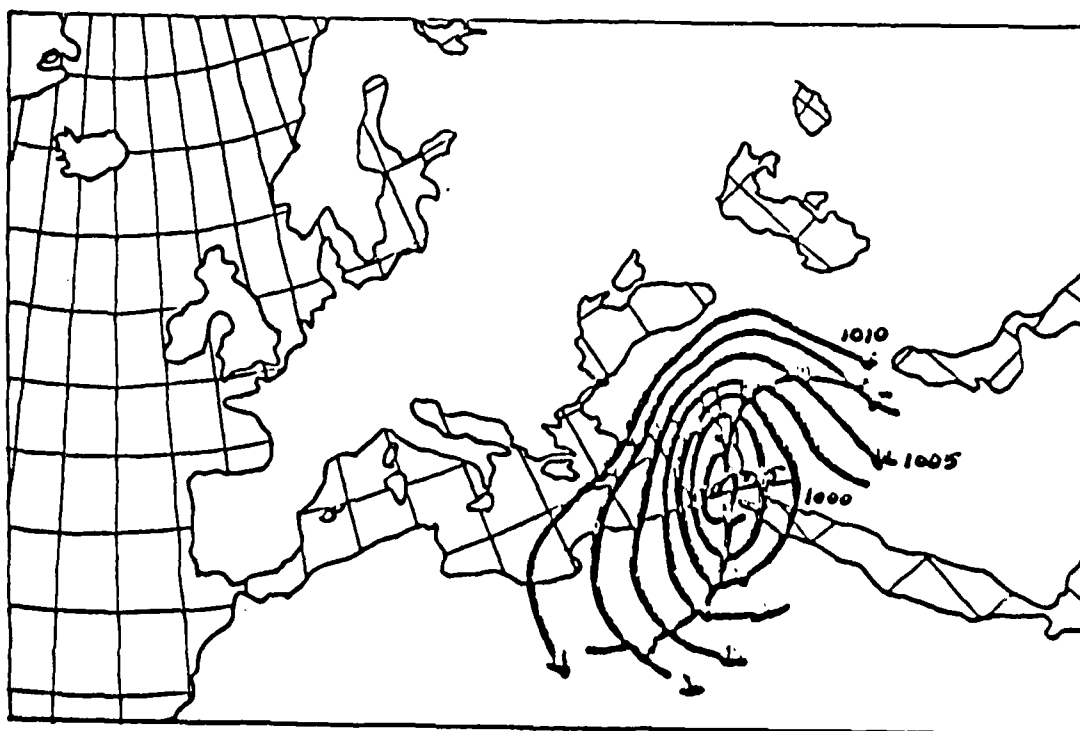


Figure 4b - Transition seasons-hot low at its peak

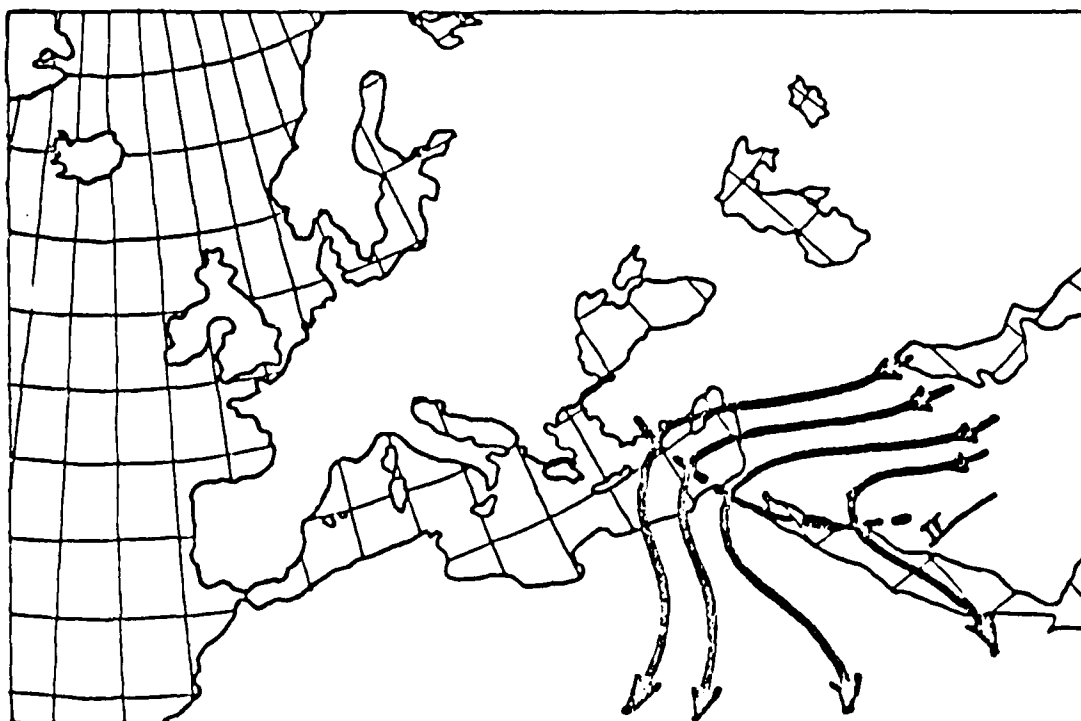


Figure 5a - Transition seasons - Red Sea Trough with western axis

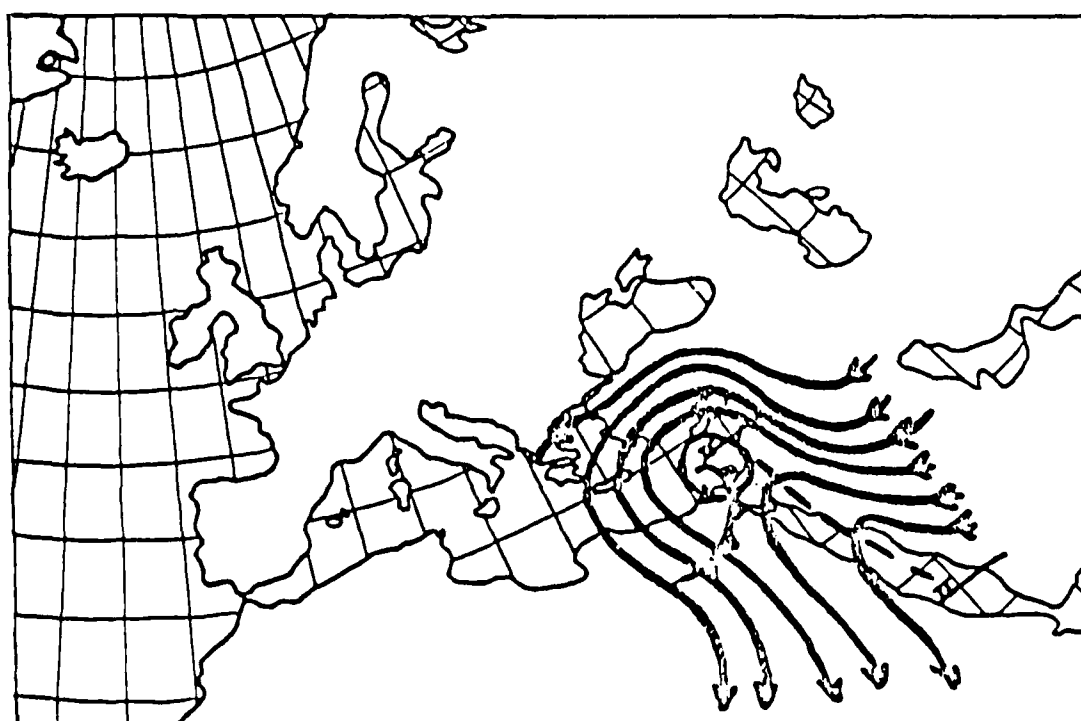


Figure 5b - Transition seasons - Red Sea Trough closing a "low" over the sea

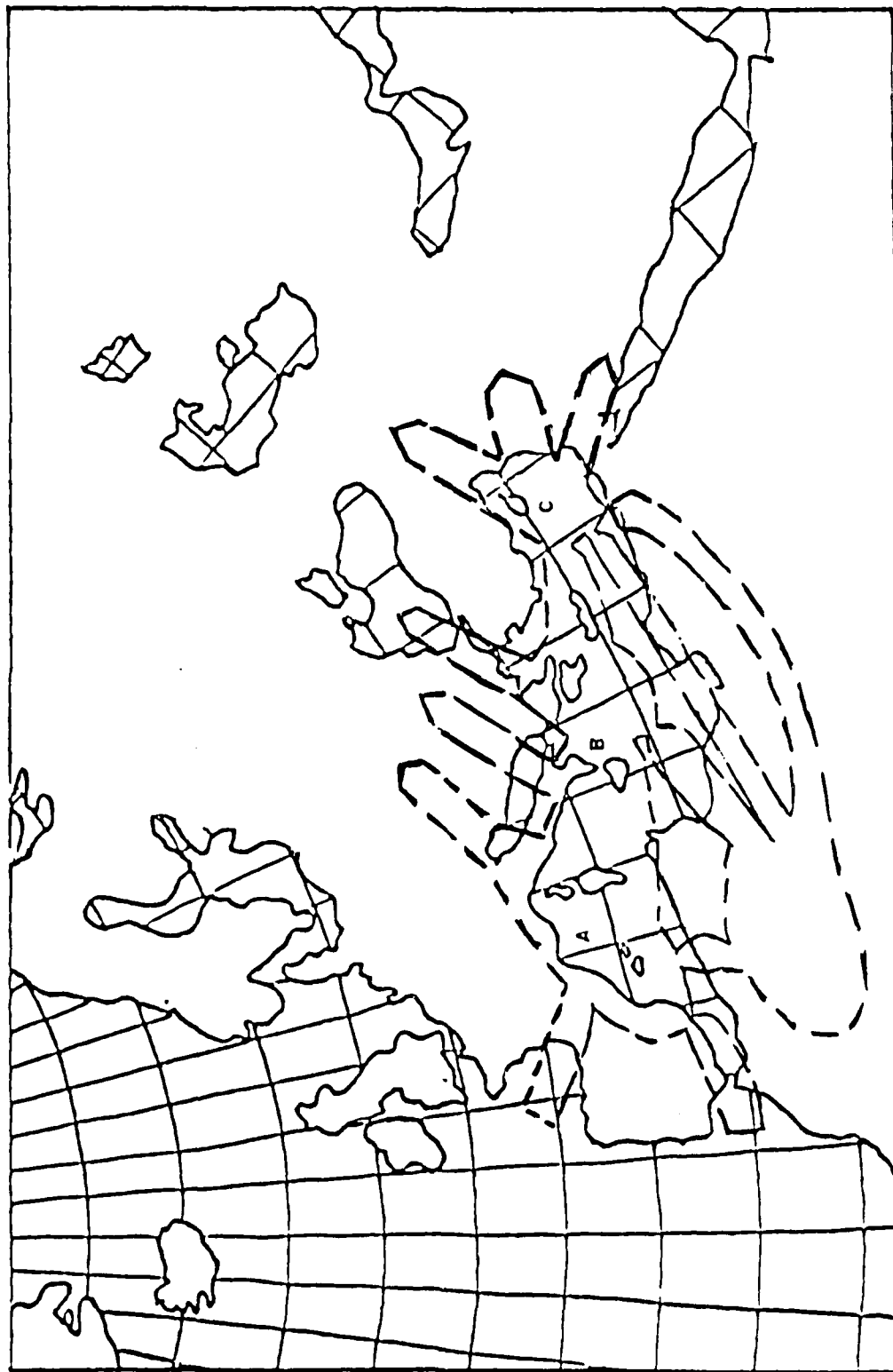


Figure 6 - Winter season - Typical Icelandic "low" and its paths in the Mediterranean

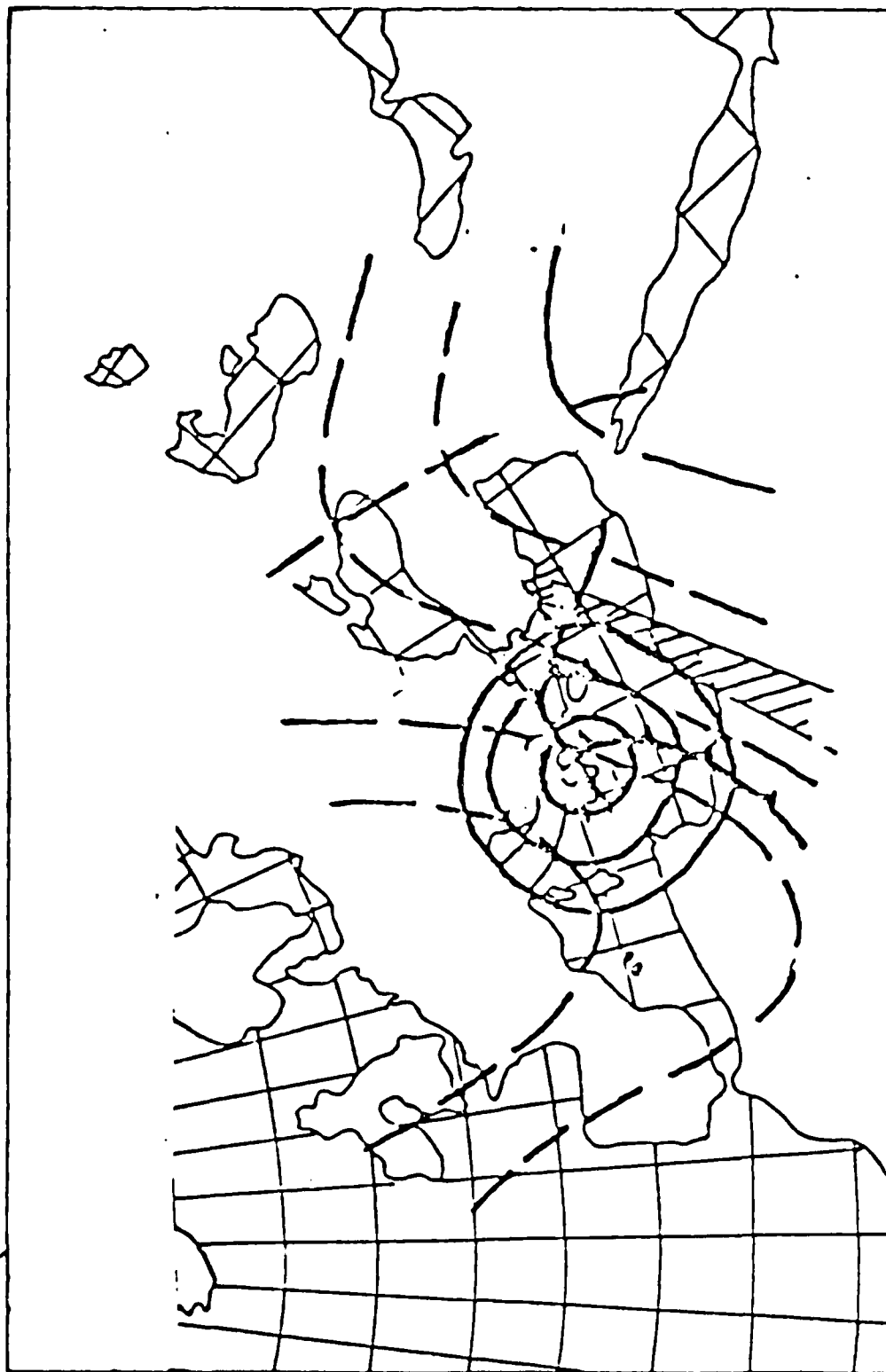


Figure 7 - Winter season - Schematic description of "Italian low" approaching the eastern Mediterranean

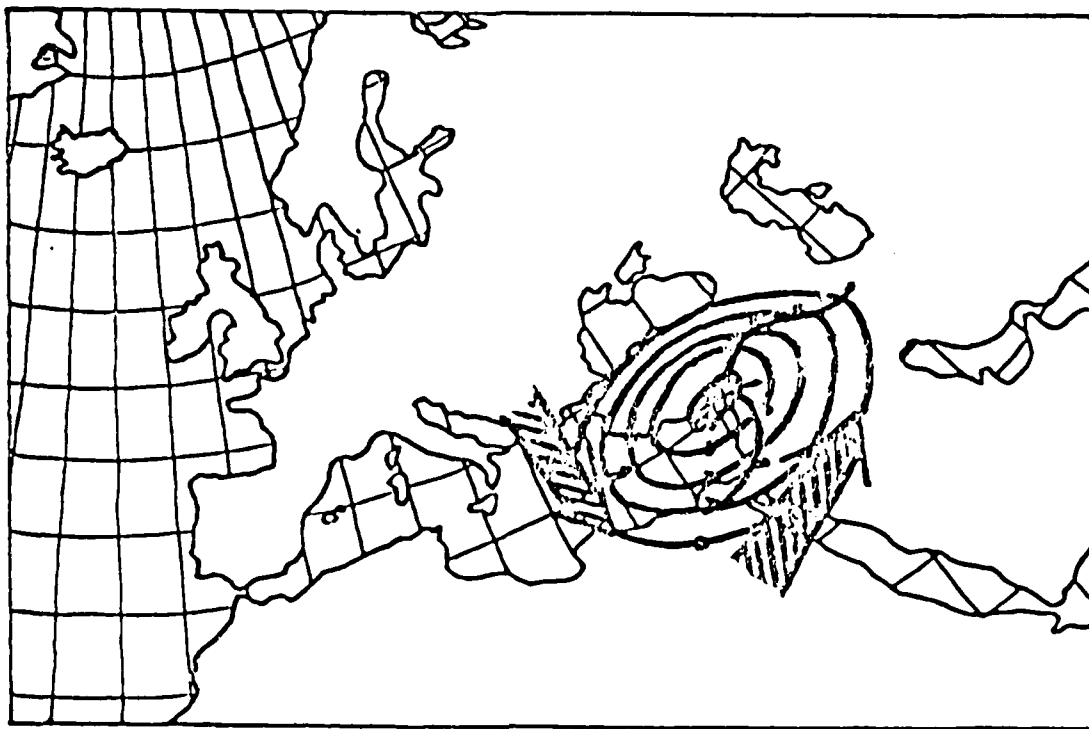


Figure 8a - Winter season - Northern (Cyprus) low

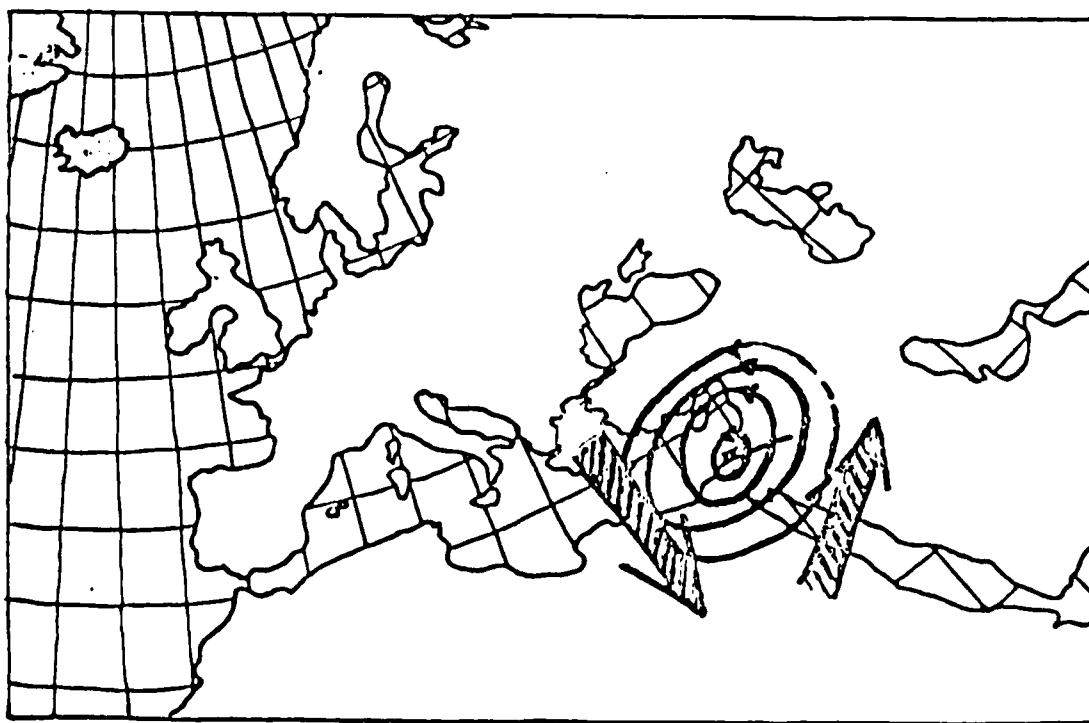


Figure 8b - Winter season - Southern (Gaza) low

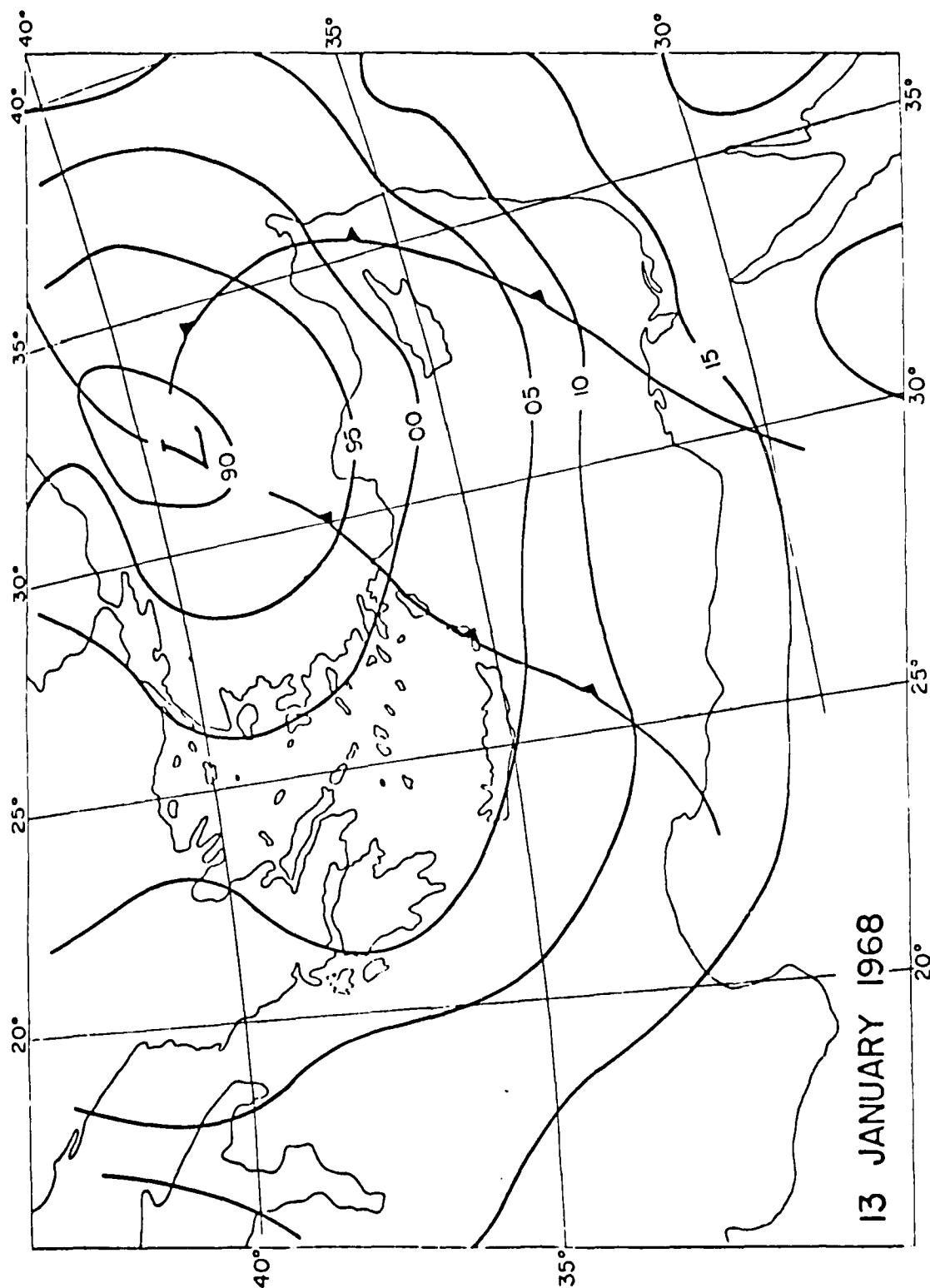


Figure 9 - Weather chart of the storm on January 13, 1968 - the largest storm in the 1958 - 1986 period

END

DATE

FILMED

APRIL

1988

DTIC